

## REMARKS

Reconsideration of this patent application is respectfully requested in view of the foregoing amendments and the following remarks.

Claim 18 has been cancelled.

Claim 19 has been amended. No new matter has been added. The amendment in step (a) is disclosed on page 4, starting in line 25. In step (c) the mathematical equations are deleted and replaced by prose.

A new claim 20 has been added differing from claim 19 only in the process step (c) by replacing the mathematical expressions with words.

Because the Restriction Requirement has been withdrawn, claims 3 to 15 have been amended to depend now from claim 19.

### **Priority document**

The German application upon which priority is claimed allegedly would fail to provide adequate support under 35 U.S.C. 112 for claims 18 and 19 of this application.

Claim 18 has been cancelled as a consequence of the withdrawal of the restriction requirement.

Claim 19 has been amended to overcome the rejections as

outlined by the Examiner. It was alleged that the German priority document would contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention for the same reasons as this application.

This issue will be addressed in the scope of the discussion of the present application.

### **Disclosure Objections**

The priority application is the national stage application DE 198 43 242. The first paragraph of the specification has been amended accordingly.

The paragraph including page 2, line 2 has been amended according to the objections raised.

A minor typographical error created the nonexistent element "Ka," which has been replaced by the existent and originally meant element "K" (potassium).

The process step (c) is objected as being indefinite since it would be unclear how set-probabilities are randomly generated. Applicants respectfully submit that the pre-set probabilities are not randomly generated, but a catalyst is randomly selected having a pre-set probability of selection.

In general, a random selection of one element from a group of elements is performed unbiased, i.e. all elements have the

same pre-set probability of selection (e.g.: elements A and B are randomly selected with a pre-set probability of selection equal to 50 %). However, it is mathematically possible to assign to a certain element a higher probability than the others while still performing the actual selection randomly (A and B are randomly selected with a pre-set probability of selection of 60 % and 40 %, respectively). This is for example a standard procedure in Monte Carlo applications.

In process step (c) of the present application the selection of a catalyst from the group of catalysts is performed unbiased, i.e. all elements have the same probability for selection. Process step (c) refers to the random selection of at least two respective catalysts with a probability  $W_{\text{cat}} = (y_{n+1})^{-1} \cdot 100\%$ . If the current number of catalysts in the specific iteration  $n+1$  is, e.g., four, then the probability is  $W_{\text{cat}} = \frac{1}{4} \times 100 \% = 25 \%$  and all four catalysts have the same probability of selection. Thus, the mathematical expression refers to the fact that all catalysts are chosen with the same probability, at the same rate.

The same holds for the selection of the components of the chosen catalysts. This step is also performed unbiased. The probability of selection is proportional to, e.g.,  $1/i$ , i.e. all components of a group of components, here the main components, have the same probability. However, since in step (b) only the best catalysts were selected, the selection depends implicitly on the fitness of the catalysts leading to a fast optimisation.

In order to recite the procedure more precisely, claim 19 has been amended accordingly. It refers now to a random selection, wherein each element has the same probability of selection. A new claim 20 has been added, differing from claim 19 only in the wording of step (c) by replacing the equations with prose, describing the expression in words.

Thus, applicants respectfully submit that the process step (c) enables one skilled in the art to make and/or use the invention.

It is objected that the "x" variables in tables 4 and 6 are not defined. The amount of oxygen employed in the sample is related to the elements present in the catalyst, their amounts and their oxidation state and needs to be determined experimentally. This amount is not optimised and is not a subject of the present invention. It is conventional in the art of catalysts not to specify the "x" variables. This will be known to any person skilled in the catalyst art to which the present application pertains.

#### **Claim Rejections under 35 USC § 112, first paragraph**

Claims 18 and 19 are rejected as allegedly containing subject matter which was not described in the Specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time of the application was filed, had possession of the claimed invention.

Claim 18 has been cancelled. However, it is respectfully submitted that the formula presented in claim 18 is not new matter.

The amount of oxygen in the sample is not varied by the present application (see claim 19). Tables 5, 7 and 8 show the changes of the catalyst components during the optimisation process. Since oxygen does not form a part of the optimisation procedure and is not varied, it is not listed in tables 5, 7 and 8.

Step (a) of claim 19 is rejected as being new matter. Claim 19 has been amended to overcome the objections raised. Step (a) now reflects that the first generation of catalysts is prepared from primary components which are already known.

Claim 19 is rejected as containing subject matter which was not described in the Specification in such a way as to enable one skilled in the art to make and/or use the invention. The preamble of claim 19 has been amended to overcome these objections.

It is respectfully submitted that one of ordinary skill in the art is able to perform step (a) without undue experimentation. Any person skilled in the art would start from catalysts which are known or have been described or have been determined empirically or intuitively for the individual reaction steps under consideration and would not need to perform undue experimentation. This is disclosed on page 4 of the present

application. Claim 19 has been amended accordingly.

**Claim Rejections under 35 USC § 112, second paragraph**

Claims 3-15, 18 and 19 are rejected as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant would regard as the invention.

Claims 3-15 are amended to depend on claim 19.

Claim 18 is cancelled.

Claim 19 now includes the existent element "K" for potassium.

The issue of pre-set probabilities has been addressed above.

Claim Rejections under 35 USC § 112, first and second paragraph have now been overcome, and withdrawal of this ground of rejection is respectfully requested.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over the article by *McLeod et al.*. It is respectfully submitted that claim 19 is patentable over *McLeod et al.*

The reference teaches the determination of the fitness of the catalyst activity experimentally. However, the paper by *McLeod et al.* is a solely theoretical paper. The fitness is determined by a Monte Carlo Simulation, i.e. theoretically and not experimentally. The Monte Carlo Simulation is not at all the selection criteria in step (c) of the present application, but

rather the determination of the fitness in step (d).

It would not be possible to perform an experimental determination of the catalyst activity in the *McLeod* reference since the reference only discloses a two-dimensional model system of a surface of a catalyst. A real catalyst is not disclosed. The distribution of catalytic sites on a two-dimensional model surface is optimised using a genetic algorithm and not the actual bulk composition of a three-dimensional real catalyst. Not the components of the catalyst themselves are optimised but only the distribution of sites on a surface. Only one step of a catalytic reaction is theoretically modelled, the diffusion limited reaction. The catalyst has only two-components. They remain unchanged. In fact, the "purpose of the present paper is to *introduce* the use of GA as a practical tool in catalyst design problems" (*McLeod*, page 284). In detail, the reference neither addresses the selection of catalyst components nor the variation of their mass compounds.

It is unclear how the theoretical results of the variation of adsorption sites on a two-dimensional surface could disclose the claimed invention as described in the present application. Thus, the present invention is patentable under 35 U.S.C. 103(a). Withdrawal of this ground of rejection is respectfully requested.

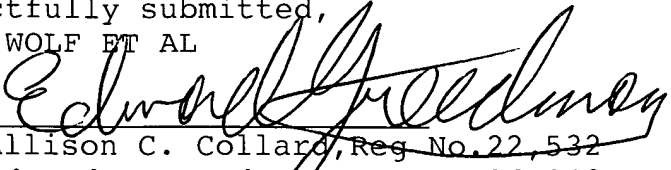
For the foregoing reasons, applicants submit that all claims are patentable over the prior art of record. Applicants submit that the application is now in condition for allowance and

passage to issuance is requested.

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Respectfully submitted,  
DORIT WOLF ET AL

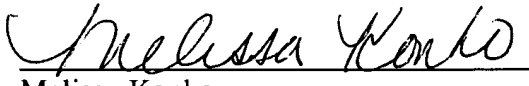
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Enclosure: Copy Petition Two Month Extension of Time

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on January 8, 2007.

  
Melissa Konko

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